APPENDIX D

CONTINGENCY MEASURE REDUCTION CALCULATIONS

|G|N|B|
TECHNOLOGIES INC.
A Pacific Dunlop Company
7471 South Fifth Street
P.O. Box 250
Frisco, TX 75034
Telephone 972-335-2121
Facsimile 972-377-2707

July 8, 1999

John Gillen
Texas Natural Resource Conservation Commission
Office of Air Quality MC 205
12100 Park 35 Circle
Austin, TX 78753

Re: GNB Technologies Inc., Frisco, Texas Facility Potential Reduction in Lead Emissions

Dear Mr. Gillen:

This letter is in response to your request for quantification of the potential reduction in lead emissions from GNB Technologies Frisco, Texas facility. The attached calculations document the engineering basis and methodology for potential emissions reductions. These reductions would be achieved by installing a wheel washing system for yard traffic and an improved tuyere cleaning method with a charging scale at the blast furnace.

The wheel washing facility has an estimated reduction of approximately 27 pounds of lead per year. The attached calculations demonstrate that this reduction is based on Section 11.2.6 of AP-42 "Industrial paved roads". This reduction would effect EPN 41 and EPN 42. In addition to the potential emission reduction the system would aid in our house keeping efforts to help reduce tracking of material.

The potential reduction from the improved tuyere cleaning method and feed scale at the blast furnace is estimated to be in excess of 30 pounds of lead per year. The attached calculations demonstrate that a simple reduction in the cleaning time per tuyere should produce an estimated reduction of 28 pounds of lead per year. Given this calculation and the experience that a feed scale would allow more consistent furnace operations, the estimate that a reduction in excess of 30 pounds of lead per year is not only reasonable but also conservative. This system would not only help to provide reduced emissions but also lower our employees' exposure to lead contamination thus aiding in the protection of human health. This would effect EPA 10. In addition an improved tuyere cleaning method might incorporate filtration of some fugitive emission further reducing EPN 10.

Mr. Steve Probst of SAGE Environmental Consulting under our direction prepared the attached calculations. I believe they document the methodologies and engineering basis for the potential reductions in lead emissions.

We appreciate your time and consideration in this matter. We hope this submittal meets your needs. GNB is hopeful that we will be successful in the redesignation of the area as lead attainment soon. If you have any questions, please feel free to give me a call at 972 335-2121 extension 26.

Sincerely,

James A. Messer
Manager Environmental and Quality Control

Copy Larry Eagan – GNB
Jennifer Keane – Baker and Botts

Vehicle Type	Industrial Augmentation Factor	Number of Traffic Lanes	Surface Material Silt Content	Surface Dust Loading	Average Vehicle Weight Unloaded	Average Vehicle Weight Loaded	Vacuum Sweeping Control Efficiency	Emission Factor, Unloaded Vehicles	Emission Factor, Loaded Vehicles	Vehicle Miles Traveled, Unloaded	Vehicle Miles Traveled, Loaded	Annual Emissions, Unloaded Vehicles	Annual Emissions, Loaded Vehicles	Total Annual Emissions
	I	n	s	L	W_U	W_L		E_U	E_L	VMT_U	VMT_L	EU	EL	
(Units)			(%)	(lbs/mile)	tons	(miles/yr	(%)	(lbs/VMT_U)	(lbs/VMT_L	(VMT_U/yr	(VMT_L/yr	(lbs/yr)	(lbs/yr)	(lbs/yr)
Small Loader	1	2	12.5	437.5	6	7	80%	0.00782	0.00871	80	80	0.6254	0.6967	1.3221
Large Loader	1	2	12.5	437.5	7	10	80%	0.00871	0.01118	318	318	2.7694	3.5548	6.3242
Forklift	1	2	12.5	437.5	3	4	80%	0.00481	0.00589	1894	1894	9.1149	11.1483	20.2632

Example Calculation for small loaders based on AP-42 Section 11.2.6 "Industrial Paved Roads" 11/88

$E = 0.022\,I\,(4/n)(s/10)(L/1000)(W/3)^{0.7}$ (1-Control Efficiency = lb/VMT

$E = 0.022\,(1)(4/2)(12.5/10)(437.5/1000)(6/3)^{0.7}$ (1-0.8) = 0.00782 lbs/VMT$_U$

0.0078 lbs/VMTU x 80 VMT/yr = 0.62543 lbs/yr

The factor of L was reduced from 1750 to 875 to account for the 50% lead content and to 437.5 to account for the reduced loading as a result of the wheel hub wash.

A = 205 lbs/yr Pb for trucks (From the Estimate of Facility Lead Emissions to be used in Computer Dispersion Modeling prepared by Lake Engineering, Inc.)
B = 1.32 lbs/yr for small loaders
C = 6.32 lbs/yr for large loaders
C = 20.26 lbs/yr for forklifts

EPN 41 = 1/3A + B + 1/2C + 1/2D = (1/3)205 + 1.32 + (1/2)6.32 + (1/2)20.26 = 82.875 lbs/yr

EPN 42 = 1/3A + 1/2C + 1/2D = (1/3)205 + (1/2)6.32 + (1/2)20.26 = 81.555 lbs/yr

This represents a reduction of 1.32 lbs for the small loaders, 6.32 lbs/yr large loaders, and 20.04 lbs/yr for forklifts.

GNB Technologies, Inc.
Tuyere Emissions Calculations
Percent Reduction

Basis:	Prior tuyere opening diameter =	1	inch
	Prior tuyere time open per cleaning event =	30	sec
	New tuyere opening diameter =	0.75	inch
	New tuyere time open per cleaning event =	10	sec

Assumptions: Pressure and velocity are dominated by furnace and atmospheric conditions and therefore remain unchanged by the change in diameter.

Calculations

Q_{old} = Velocity x Area = $(v_{old})(A_{old})$

where
Q = flowrate
v = velocity
A_{old} = cross sectional area of the old opening during tuyere punching

M_{old} = Flow Rate x Concentration x Time = $(Q_{old})*(C_{old})*(t_{old})$

where
C = Concentration
t_{old} = time the old tuyere opening was exposed to atmospheric pressure

Q_{new} = Velocity x Area = $(v_{new})(A_{new})$

where
Q = flowrate
v = velocity
A_{new} = New cross sectional area of the tuyere opening during tuyere punching

M_{new} = Flow Rate x Concentration x Time = $(Q_{new})*(C_{new})*(t_{new})$

where
C = Concentration

GNB Technologies, Inc.
Tuyere Emissions Calculations
Percent Reduction

t_{new} = time the new tuyere opening is exposed to atmospheric pressure

The percentage reduction will be the ratio of the mass lost from the old tuyere punching design to the new tuyere punching design.

$$\frac{M_{new} = \text{Flow Rate x Concentration x Time} = (Q_{new})*(C_{new})*(t_{new})}{M_{old} = \text{Flow Rate x Concentration x Time} = (Q_{old})*(C_{old})*(t_{old})} =$$

The concentration is assumed to remain constant therefore

$$\frac{M_{new}}{M_{old}} = \frac{(Q_{new})*(t_{new})}{(Q_{old})*(t_{old})}$$

Substituting

Q_{new} = Velocity x Area = $(v_{new})(A_{new})$
Q_{old} = Velocity x Area = $(v_{old})(A_{old})$

$$\frac{M_{new}}{M_{old}} = \frac{(vnew)*(Anew)*(t_{new})}{(vold)*(Aold)*(t_{old})}$$

The velocity is assumed to be constant.

$A_{new} = pi\ r_{new}^2 = 3.14\ (0.75)^2$
$A_{old} = pi\ r_{old}^2 = 3.14\ (1)^2$

Substituting

$$\frac{M_{new}}{M_{old}} = \frac{pi\ r_{new}^2*(t_{new})}{pi\ r_{old}^2*(t_{old})}$$

$$\frac{M_{new}}{} = \frac{pi\ r_{new}^2*(t_{new})}{}$$

GNB Technologies, Inc.
Tuyere Emissions Calculations
Percent Reduction

$$M_{old} \quad \frac{}{pi\ r_{old}^{2}*(t_{old})}$$

$$\frac{M_{new}}{M_{old}} = \frac{(0.75\ inch)^2*(10\ sec)}{(1\ inch)^2*(30\ sec)} = \frac{5.625}{30}$$

$$\frac{M_{new}}{M_{old}} = 0.1875$$

Per the 1997 emissions inventory the lead emissions were estimated to be 0.0174 tpy.
The new emissions are estimated to be (0.0174)(0.1875) = 0.0033 tpy
The emissions were reduced by 0.0141 tpy or 28.275 lbs/yr

Due to the length of the document, the body of this report
is not available in electronic file.

Contact Chris Kite, (512) 239-1959 or ckite@tceq.state.tx.us
of the TCEQ to attain a hardcopy version.